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FOREST INSECT CONDITIONS

in the Pacific Northwest during 1966

by

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INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U.S. DEPARTMENT OF AGRICULTURE
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This report, the 19th in an annual series, is based on cooperative aerial and ground surveys sponsored by the Northwest Forest Pest Action Council. The principal cooperators were the Washington State Department of Natural Resources, Oregon State Department of Forestry, and U. S. Forest Service. Many individuals from these organizations made the survey possible.

COVER BACKGROUND: Mountain pine beetle damage in young ponderosa pine stands on Dooley Mountain, Wallowa-Whitman National Forest.

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SURVEY FINDINGS IN BRIEF

This year destructive forest insect outbreaks occurred on 1,224,170 acres of forest lands in Oregon and Washington (Table 1). Defoliators accounted for more than two-thirds of the effected acreage, the majority of which was caused by the larch casebearer. Defoliator outbreaks caused little or no tree mortality in 1966. Bark beetles caused the highest timber losses through tree mortality. Sucking insect damage was lower than last year and caused less damage than any other group of insects.

The infested acreage was lower than the ten-year average of 1,456,700 acres. The outbreak acreage trend for the past decade is as follows:

Year	Acres infested	Year	Acres infested
1957	2,129,440	1962	1,305,170
1958	2,032,720	1963	1,319,120
1959	1,448,360	1964	1,208,570
1960	1,272,960	1965	1,403,300
1961	1,223,230	1966	1,224,170

The extent and intensity of outbreaks by insect species occurring in Oregon are given in Table 37 and in Washington in Table 38. The major problem areas of insect outbreaks are shown in the generalized map in Figure 2.

Both States are divided into forest insect reporting areas as shown on the inside of back cover. These insect reporting areas are a simple convenience for reporting conditions in a geographical area. No attempt has been made to summarize insect outbreaks according to land ownership or management within an individual reporting area.

Briefly the main findings of both aerial and ground surveys in 1966 were:

1. Mountain pine beetle.--Outbreaks in western white pine stands decreased in both Oregon and Washington. Outbreaks on ponderosa pine also decreased in both States, but the potential for catastrophic outbreaks still remains. On lodgepole pine losses were lower in both States. Outbreaks on sugar pine remained at a low level.

2. Douglas-fir beetle.--The destructive outbreaks of this beetle in the westside Douglas-fir stands decreased over the past year. In eastside Douglas-fir stands the losses were slightly lower.

3. Western pine beetle.--Losses to this bark beetle were generally lower over the Region. Most damage occurred as scattered tree killing.

4. Fir engraver beetle.--Attacks of this insect were downward in both Oregon and Washington.

5. Oregon pine ips.--Losses were greatly reduced in both States.

6. Engelmann spruce beetle.--Overall losses were generally downward, with some localized damage increasing.

7. Silver fir beetles.--Losses increased in Pacific silver fir stands of Washington. No losses were reported in Oregon.

8. Larch casebearer.--Infestations of this introduced insect continued to spread in the western larch stands of northeast Washington. Parasites were released for the first time in the State of Washington.

9. Larch sawfly.--Outbreaks decreased in Oregon and increased in Washington. An overall static trend is expected.

10. Douglas-fir tussock moth.--Epidemic outbreaks of this insect collapsed in both States.

11. Pine needle miner.--Outbreaks increased rapidly in the ponderosa and lodgepole pine stands of central Oregon.

12. Western oak looper.--Outbreaks declined with only minor damage in small localized areas in the Willamette Valley of Oregon.

13. European pine shoot moth.--The infestation continued to spread within the Containment Zone in Washington. All pines in an infested nursery in Portland, Oregon were fumigated and sprayed to eradicate the insect.

14. Blackheaded budworm.--Damage was very light in central Oregon and is is expected to continue to decline.

15. Balsam woolly aphid.--Losses decreased in both States. Infestations were found further south in the southern Coast Range of Oregon.

Table 1 - Summary of 1966 forest insect epidemic infestations in Oregon and Washington

Insects [1]	Oregon		Washington		Regional total	
	Infestation centers	Area	Infestation centers	Area	Infestation centers	Area
	Number	Acres	Number	Acres	Number	Acres
Defoliators:						
Black-headed budworm	1	100	0	0	1	100
Sawflies on true firs	1	520	0	0	1	520
Sawflies on larch	1	5,600	14	8,300	15	13,900
Western oak looper	2	340	0	0	2	340
Needle miners (L)	80	148,460	0	0	80	148,460
Needle miners (P)	9	46,640	0	0	9	46,640
Larch casebearer	0	0	105	470,680	105	470,680
All defoliators	94	201,660	119	478,980	213	680,640
Sucking insects:						
Balsam wooly aphid	291	42,320	44	11,160	335	53,480
Spider mites	7	6,520	0	0	7	6,520
All sucking insects	298	48,840	44	11,160	342	60,000
Bark beetles:						
Douglas-fir beetle (Westside)	643	45,280	49	5,220	692	50,500
Douglas-fir beetle (Eastside)	76	4,590	119	22,300	195	26,890
Engelmann spruce beetle	57	6,170	27	4,430	84	10,600
Fir engraver	159	11,480	56	5,870	215	17,350
Mountain pine beetle (L)	339	89,390	1	80	340	89,470
Mountain pine beetle (S)	30	2,370	0	0	30	2,370
Mountain pine beetle (W)	657	71,540	292	74,410	949	145,950
Mountain pine beetle (P)	352	54,230	93	21,730	445	75,960
Oregon pine ips	60	3,870	5	640	65	4,510
Western pine beetle	239	37,820	53	9,610	292	47,430
Silver fir beetles	0	0	53	12,500	53	12,500
All bark beetles	2,612	326,740	748	156,790	3,360	483,530
All insects	3,004	577,240	911	646,930	3,915	1,224,170

[1] Mountain pine beetle and needle miner infestations are separated by tree species: L, lodgepole pine; S, sugar pine; W, western white pine; P, ponderosa pine.

INTRODUCTION

Epidemic outbreaks of forest insects were detected and mapped according to intensity of damage from the air. Ground surveys were made to verify the aerial survey findings, detect subepidemic insect populations, and evaluate threat and insect population trends.

The problems of bear damage to forest trees and dying hemlock were recorded and discussed at the request of the Northwest Forest Pest Action Council.

DEFOLIATORS OF PRIMARY IMPORTANCE

Standards used in the aerial detection survey for evaluation of forest defoliator outbreaks are as follows:

Defoliation intensity	Appearance of damage
Light	Barely visible from air
Moderate	Top 1/4 of tree defoliated
Heavy	Top 1/2 of tree defoliated
Very heavy	Top 3/4 of tree defoliated

LARCH CASEBEARER
Coleophora laricella (Hübner)

Spread of the moth within the State of Washington has been both rapid and spectacular. From the initial report in 1960 of the moth on Mica Peak, it has now spread to over 470,680 acres of epidemic outbreak (Table 2). Subepidemic populations can be found in all larch stands in Spokane, Pend Oreille, Stevens, and part of Ferry Counties (Figure 1). No casebearer has been reported in the State of Oregon.

Defoliation ranges from light to very heavy (Table 3). However, no tree mortality can be related directly to defoliation even in those trees that have been heavily defoliated since the early outbreak years.

Releases of the parasite, *Agathis pumila* (Ratz.) were made at eleven localities (Figure 1). At three of the sites, releases were

made by U. S. Forest Service, Region 1 personnel. At the other sites the parasites were released as a cooperative project with the Washington State Department of Natural Resources. At ten of the localities the releases were "wild" releases; i.e., the parasites were not confined to the release tree. At the release site on the Colville Indian Reservation the parasites were confined to the release tree with cloth net bags in an attempt at parasite propagation for future releases in other localities. Midwinter counts revealed the increases in parasite numbers were not sufficient to use as 1967 release stock. As in 1966, the release stock for 1967 will be obtained from the U. S. Forest Service, Region 1 stock in Idaho.

Table 2.--Trend of larch casebearer infestations in Washington, 1962-66

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Kaniksu N.F.	0	6,270	30,180	167,480	244,140
Northeast Washington Dist.	5,280	30,760	82,530	151,160	137,500
Colville N.F.	0	0	200	17,180	63,840
Colville I.R.	0	0	0	1,120	2,600
Spokane I.R.	0	0	0	3,440	22,600
All areas	5,280	37,030	112,910	340,380	470,680

1/ N.F., National Forest; I.R., Indian Reservation

Table 3.--Extent of larch casebearer infestations in Washington in 1966, by reporting area and intensity of infestation

Reporting area [1]	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Washington :						
Colville N.F.	23	43,400	13,880	3,880	2,680	63,840
Colville I.R.	4	400	0	0	2,200	2,600
Spokane I.R.	8	17,180	3,840	1,580	0	22,600
Northeast Wash. Dist.	49	59,720	42,500	27,320	7,960	137,500
Kaniksu N.F.	21	144,180	21,720	35,200	43,040	244,140
Washington areas	105	264,880	81,940	67,980	55,880	470,680
Regional total	105	264,880	81,940	67,980	55,880	470,680

[1] N.F., National Forest; I.R., Indian Reservation

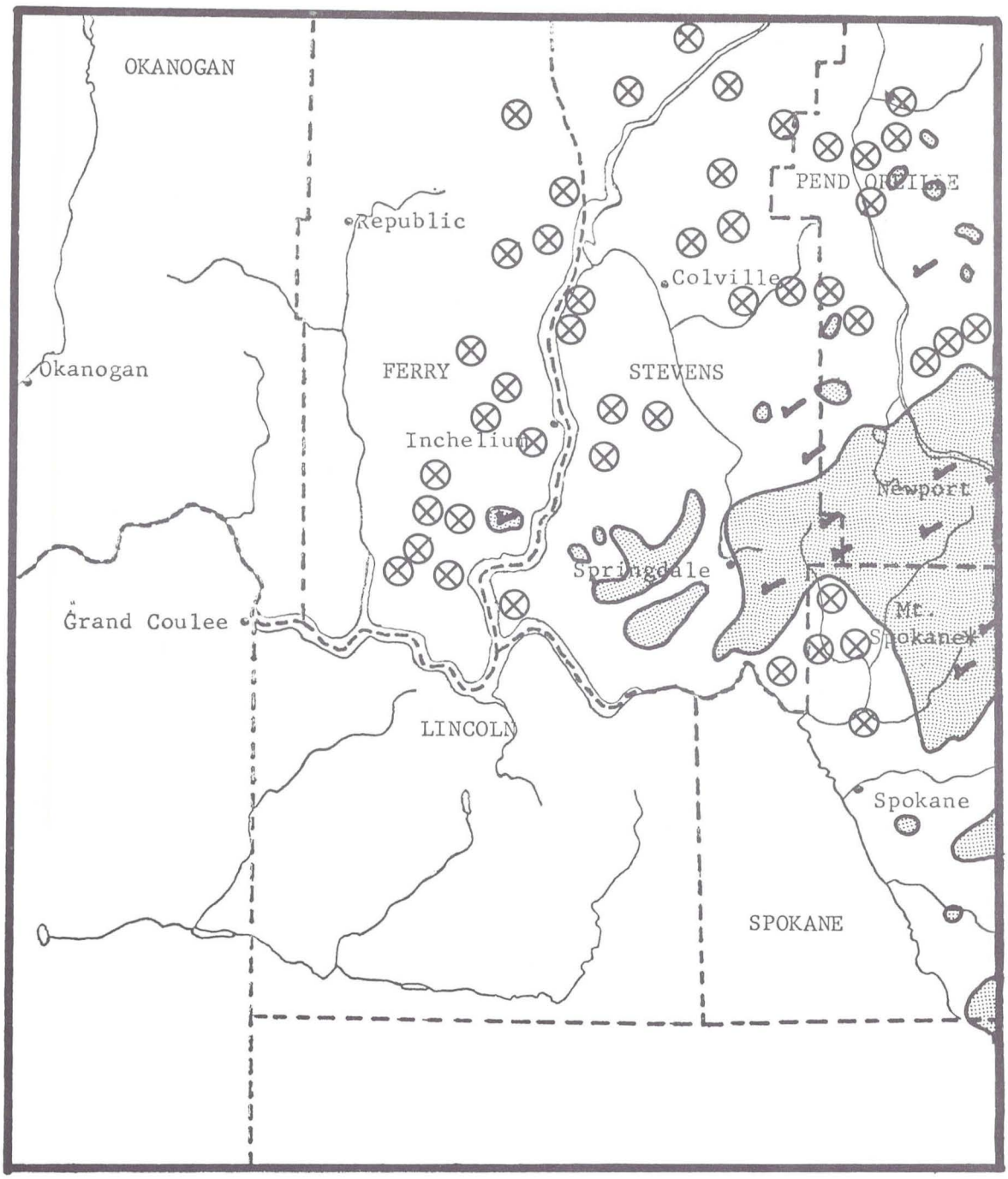

Figure 1.--Distribution of larch casebearer in northeast Washington

Epidemic populations. Damage recorded by aerial survey.

Subepidemic populations. Detected by ground surveys.

Parasite liberation plots.

LARCH SAWFLY
Pristiphora erichsonii (Htg.)

Larch sawfly populations in western larch stands increased in Washington. Outbreaks ranging in size from a few acres to those occupying several hundred acres developed along the Canadian border in northeast Washington. Subepidemic populations were found over a wide area of northeast Washington as well as on the Yakima Indian Reservation. In Oregon the outbreaks on the Mt. Hood National Forest subsided to subepidemic status but remained static on the Warm Springs Indian Reservation (Table 4).

No tree mortality has occurred as a result of defoliation, nor is any mortality expected in any of the outbreak areas in the immediate future.

Parasitism by a wasp, *Tritnepis* sp. is heavy in most outbreak areas and will probably reduce local populations. No control measures are planned.

Table 4.--Extent of larch sawfly infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area [1/]	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Warm Springs I.R.	1	5,600	0	0	0	5,600
Oregon areas	1	5,600	0	0	0	5,600
Washington:						
Okanogan N.F.	2	0	280	0	0	280
Colville N.F.	10	1,800	3,760	900	240	6,700
Kaniksu N.F.	2	0	480	840	0	1,320
Washington areas	14	1,800	4,520	1,740	240	8,300
Regional total	15	7,400	4,520	1,740	240	13,900

[1/] I.R., Indian Reservation; N.F., National Forest

PINE NEEDLE MINER
Coleotechnites sp. near milleri

Light to very heavy defoliation occurred over wide areas of lodgepole pine stands on the Deschutes, Winema, and Fremont National Forests in Oregon (Table 5). Populations of this moth have now been on the increase for the past three years. No decrease in damage is expected next year.

In ponderosa pine stands on the Winema National Forest, light defoliation occurred in nine outbreak centers and encompassed 46,640 acres.

No control measures are planned for next year. The situation will be watched very closely, however.

Table 5.--Extent of needle miner infestations on lodgepole pine in Oregon in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Fremont N.F.	1	240	0	0	0	240
Winema N.F.	46	41,260	19,270	6,360	6,790	73,680
Deschutes N.F.	33	67,940	4,760	1,840	0	74,540
Oregon areas	80	109,440	24,030	8,200	6,790	148,460
Regional total	80	109,440	24,030	8,200	6,790	148,460

1/ N.F., National Forest

BALSAM WOOLLY APHID
Adelges piceae (Ratz.)

The loss trend varied according to host species and area (Table 6). The majority of the damage occurred in subalpine fir with lesser amounts in Pacific silver fir. In Oregon, damage decreased in subalpine fir along the Cascade Mountains but increased in lowland white fir in the southern Coast Range. Outbreaks have been detected as far south as Powers, Oregon in the Coquille River drainage. In Washington, damage occurred on the Snoqualmie and Gifford Pinchot National Forests, Yakima Indian Reservation, and Mt. Rainier National Park, with only the latter showing an increasing damage trend (Table 7).

Limited insecticide field tests were made against the aphid in a high-use recreational area on the north slope of Mt. St. Helens. Subalpine fir (10 to 40 ft. in height) were sprayed with a ground sprayer using BHC. Fall observations of the individual test trees indicate substantial control. Additional tests are planned for 1967.

Table 6.--Trend of balsam woolly aphid infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Willamette N.F.	33,920	44,710	72,760	19,430	16,780
Umpqua N.F.	4,280	11,830	17,960	4,320	3,580
Mt. Hood N.F.	5,840	9,870	17,660	7,530	6,460
Deschutes N.F.	4,000	19,640	17,320	5,260	2,370
Siuslaw N.F.	3,460	4,030	340	0	120
Winema N.F.	300	410	0	0	0
Rogue River N.F.	0	6,600	18,760	4,140	4,850
Warm Springs I.R.	0	3,380	1,380	1,750	420
Crater Lake N.P.	0	1,680	1,320	3,350	1,840
Coos-Douglas Dist.	0	0	520	640	5,060
Northwest Oregon Dist.	0	0	20	0	0
Siskiyou N.F.	0	0	0	0	840
Oregon areas	51,800	102,150	148,040	46,420	42,320
Washington:					
Gifford Pinchot N.F.	2,590	63,930	25,860	11,040	8,360
Yakima I.R.	360	6,960	840	400	320
Southwest Washington District	1,760	0	1,040	980	0
Snoqualmie N.F.	0	10,560	5,800	7,800	1,680
Mt. Rainier N.P.	0	3,260	1,120	360	800
Wenatchee N.F.	0	600	720	240	0
Washington areas	4,710	85,310	35,380	20,820	11,160
Regional total	56,510	187,460	183,420	67,240	53,480

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

Table 7.--Extent of balsam woolly aphid infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Deschutes N.F.	25	1,680	610	80	0	2,370
Mt. Hood N.F.	48	5,870	490	100	0	6,460
Rogue River N.F.	26	1,850	740	1,320	940	4,850
Siuslaw N.F.	2	120	0	0	0	120
Siskiyou N.F.	1	840	0	0	0	840
Umpqua N.F.	21	2,790	790	0	0	3,580
Willamette N.F.	128	13,050	3,700	30	0	16,780
Warm Springs I.R.	5	420	0	0	0	420
Coos-Douglas Dist.	28	3,700	660	700	0	5,060
Crater Lake N.P.	7	1,380	240	0	220	1,840
Oregon areas	291	31,700	7,230	2,230	1,160	42,320
Washington:						
Gifford Pinchot N.F.	29	3,960	1,360	2,640	400	8,360
Snoqualmie N.F.	11	1,040	400	40	200	1,680
Yakima I.R.	2	80	0	240	0	320
Mt. Rainier N.P.	2	360	0	0	440	800
Washington areas	44	5,440	1,760	2,920	1,040	11,160
Regional total	335	37,140	8,990	5,150	2,200	53,480

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park

MOUNTAIN PINE BEETLE
Dendroctonus ponderosae Hopk.

Regionwide, the total infested acreage in all pine species decreased but losses remained high in most cases. The conditions by tree species are as follows:

Western white pine. Losses were only slightly downward in Oregon but reduced almost by half in Washington (Table 8). Much of the apparent reduction in losses in Washington is due to the depletion of susceptible host trees from many stands by both the mountain pine beetle and the white pine blister rust. Most losses in Oregon occurred along the Cascade Crest on the Mt. Hood, Willamette, Umpqua, and Siskiyou National Forests and Crater Lake National Park. In Washington, losses were widespread in all western white pine stands. Areas of most damage occurred on the Wenatchee, Snoqualmie, Mt. Baker, and Colville National Forests, Olympic National Park, and Quinault Indian Reservation (Table 9).

Ponderosa pine. Although losses were lower than last year, serious tree killing continued in many places with the potential for catastrophic losses still at hand (Table 10). In Oregon, serious outbreak conditions occurred on the Fremont, Wallowa-Whitman, Malheur, and Winema National Forests. Losses continued severe on parts of the Okanogan National Forest and the Colville Indian Reservation in Washington (Table 11). Control efforts against the mountain pine beetle in ponderosa pine stands have been logging and salvage of merchantable infested trees and fell, pile, and burn the smaller and unmerchantable trees. These control methods have successfully controlled the beetle in many outbreak areas. Thinning of dense, overstocked stands is progressing at an increasingly rapid pace in an effort to improve stand vigor and reduce hazard to beetle outbreaks.

Lodgepole pine. In Oregon, losses were only slightly downward (Table 12) with significant tree killing continuing on the Winema, Fremont, Deschutes, Malheur, and Wallowa-Whitman National Forests and Crater Lake National Park. Infestations were sharply downward in Washington with only the Yakima Indian Reservation receiving significant losses (Table 13).

Sugar pine. Tree killing in the sugar pine stands of Oregon was generally reduced (Table 14). Outbreaks of serious proportions occurred on the Rogue River and Deschutes National Forests (Table 15). Elsewhere losses occurred as scattered single trees or small groups.

Table 8.--Trend of mountain pine beetle infestations in western white pine in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Mt. Hood N.F.	33,240	39,770	36,820	27,810	7,720
Willamette N.F.	32,560	22,500	43,440	38,240	34,750
Umpqua N.F.	7,760	3,350	6,070	2,920	21,130
Warm Springs I.R.	160	80	200	80	0
Deschutes N.F.	0	1,520	1,640	230	30
Winema N.F.	0	620	0	240	0
Siskiyou N.F.	0	0	4,340	1,680	5,660
Rogue River N.F.	0	0	190	920	480
Fremont N.F.	0	0	0	0	100
Coos-Douglas Dist.	0	0	0	0	80
Crater Lake N.P.	0	0	0	0	1,590
Oregon areas	73,720	67,840	92,700	72,120	71,540
Washington:					
Gifford Pinchot N.F.	140,370	98,330	31,300	12,870	3,720
Olympic N.P.	87,000	114,600	57,270	26,940	12,980
Wenatchee N.F.	34,480	79,280	20,640	40,520	21,640
Snoqualmie N.F.	32,060	32,060	22,640	11,960	9,100
Mt. Baker N.F.	25,540	43,060	4,270	1,440	8,320
Olympic N.F.	19,000	23,600	15,870	7,960	2,320
Mt. Rainier N.P.	7,250	9,740	4,240	1,920	880
Quinault I.R.	2,560	7,040	2,180	5,320	4,750
Kaniksu N.F.	940	1,290	10,440	3,480	2,120
Yakima I.R.	320	540	1,040	2,920	1,920
Okanogan N.F.	250	1,000	130	840	1,560
Colville N.F.	0	0	3,690	9,280	4,820
Northwest Washington Dist.	0	0	1,560	0	0
Northeast Washington Dist.	0	0	720	0	40
Glenwood Dist.	0	0	0	1,160	0
Puget Sound Dist.	0	0	0	720	0
Spokane I.R.	0	0	0	0	240
Washington areas	349,770	410,540	175,990	127,330	74,410
Regional total	423,490	478,380	268,690	199,450	145,950

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park

Table 9.--Extent of mountain pine beetle infestations on western white pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area [1]	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Deschutes N.F.	1	30	0	0	0	30
Fremont N.F.	1	100	0	0	0	100
Mt. Hood N.F.	56	5,080	1,660	980	0	7,720
Rogue River N.F.	7	480	0	0	0	480
Siskiyou	80	4,870	790	0	0	5,660
Umpqua N.F.	254	14,260	5,860	840	170	21,130
Willamette N.F.	244	19,380	8,540	4,630	2,200	34,750
Coos-Douglas Dist.	1	80	0	0	0	80
Crater Lake N.P.	13	540	390	420	240	1,590
Oregon areas	657	44,825	17,240	6,870	2,610	71,540
Washington:						
Gifford Pinchot N.F.	16	2,680	520	400	120	3,720
Mt. Baker N.F.	42	6,640	1,640	40	0	8,320
Okanogan N.F.	7	1,320	240	0	0	1,560
Olympic N.F.	6	1,320	560	440	0	2,320
Snoqualmie N.F.	38	3,720	4,340	800	240	9,100
Wenatchee N.F.	74	8,160	5,960	4,680	2,840	21,640
Colville N.F.	14	1,500	1,600	680	1,040	4,820
Quinault I.R.	11	3,750	0	400	600	4,750
Spokane I.R.	1	240	0	0	0	240
Yakima I.R.	6	520	1,040	360	0	1,920
Northeast Wash. Dist.	1	40	0	0	0	40
Mt. Rainier N.P.	3	840	0	0	40	880
Olympic N.P.	64	6,720	3,340	2,040	880	12,980
Kaniksu N.F.	9	2,120	0	0	0	2,120
Washington areas	292	39,570	19,240	9,840	5,760	74,410
Regional total	949	84,390	36,480	16,710	8,370	145,950

[1] N.F., National Forest; I.R., Indian Reservation; N.P., National Park

Table 10.--Trend of mountain pine beetle infestations in ponderosa pine in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Fremont N.F.	1,380	4,970	2,920	16,740	8,150
Rogue River N.F.	1,200	940	1,840	170	370
Wallowa-Whitman N.F.	910	18,680	21,400	48,410	28,480
Malheur N.F.	280	1,760	6,730	29,170	4,040
Umatilla N.F.	50	3,080	4,680	3,140	1,460
Umpqua N.F.	0	830	0	120	200
Ochoco N.F.	0	700	1,340	2,370	630
Deschutes N.F.	0	280	120	2,550	1,000
Warm Springs I.R.	0	160	70	0	320
Winema N.F.	0	160	910	4,910	5,590
Siskiyou N.F.	0	0	1,600	1,290	260
Central Oregon Dist.	0	660	520	680	2,510
Crater Lake N.P.	0	0	200	0	0
Umatilla I.R.	0	0	80	20	80
Mt. Hood N.F.	0	0	30	50	900
Coos-Douglas Dist.	0	0	0	0	240
Oregon areas	3,820	32,220	42,440	109,620	54,230
Washington:					
Yakima I.R.	960	0	680	6,780	720
Umatilla N.F.	180	430	1,270	4,280	1,030
Colville N.F.	160	200	2,530	3,280	2,080
Glenwood Dist.	40	0	520	40	560
Wenatchee N.F.	0	520	120	580	860
Okanogan N.F.	0	0	6,480	15,400	12,040
Colville I.R.	0	0	2,070	1,010	4,000
Gifford Pinchot N.F.	0	0	160	0	0
Spokane I.R.	0	0	0	280	200
Snoqualmie N.F.	0	0	0	280	0
Northeast Washington Dist.	0	0	0	0	240
Washington areas	1,340	1,150	13,830	31,930	21,730
Regional total	5,160	33,370	56,270	141,550	75,960

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park

Table 11.--Extent of mountain pine beetle infestations on ponderosa pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Deschutes N.F.	13	790	210	0	0	1,000
Fremont N.F.	59	3,650	3,690	390	420	8,150
Malheur N.F.	27	2,360	1,120	560	0	4,040
Mt. Hood N.F.	13	550	270	80	0	900
Ochoco N.F.	6	630	0	0	0	630
Rogue River N.F.	5	370	0	0	0	370
Siskiyou N.F.	6	260	0	0	0	260
Umatilla N.F.	22	1,430	30	0	0	1,460
Umpqua N.F.	3	200	0	0	0	200
Wallowa-Whitman N.F.	141	12,280	7,710	4,020	4,470	28,480
Winema N.F.	39	3,190	1,560	600	240	5,590
Umatilla I.R.	2	80	0	0	0	80
Warm Springs I.R.	4	320	0	0	0	320
Central Oregon Dist.	9	1,550	920	40	0	2,510
Coos-Douglas Dist.	3	240	0	0	0	240
Oregon areas	352	27,900	15,510	5,690	5,130	54,230
Washington:						
Okanogan N.F.	41	4,480	5,680	1,120	760	12,040
Umatilla N.F.	7	1,030	0	0	0	1,030
Wenatchee N.F.	5	440	100	80	240	860
Colville N.F.	11	1,120	200	0	760	2,080
Colville I.R.	20	1,280	2,280	200	240	4,000
Spokane I.R.	2	200	0	0	0	200
Yakima I.R.	3	600	120	0	0	720
Northeast Wash. Dist.	1	0	240	0	0	240
Glenwood Dist.	3	560	0	0	0	560
Washington areas	93	9,710	8,620	1,400	2,000	21,730
Regional total	445	37,610	24,130	7,090	7,130	75,960

1/ N.F., National Forest; I.R., Indian Reservation

Table 12.--Trend of mountain pine beetle infestations in lodgepole pine in Oregon and Washington, 1962-66

(In acres)

Reporting area [1]	Year				
	1962	1963	1964	1965	1966
Oregon:					
Winema N.F.	20,390	17,060	17,100	21,560	29,650
Fremont N.F.	18,120	13,390	21,950	47,100	38,380
Deschutes N.F.	17,730	10,330	9,100	11,930	10,480
Crater Lake N.P.	5,440	1,180	2,000	1,800	1,030
Malheur N.F.	1,450	610	2,060	8,410	4,540
Wallowa-Whitman N.F.	1,160	2,640	1,440	3,130	4,230
Rogue River N.F.	640	360	1,100	0	180
Umpqua N.F.	200	2,190	160	0	200
Umatilla N.F.	60	2,020	530	140	670
Ochoco N.F.	10	0	0	40	0
Willamette N.F.	0	355	160	0	0
Warm Springs I.R.	0	85	0	0	0
Siskiyou N.F.	0	0	190	80	30
Oregon areas	65,200	50,220	55,790	94,190	89,390
Washington:					
Colville N.F.	1,720	4,360	3,540	0	0
Wenatchee N.F.	800	390	1,800	840	0
Okanogan N.F.	390	1,200	2,170	440	0
Colville I.R.	120	480	180	0	0
Umatilla N.F.	10	190	0	50	0
Kaniksu N.F.	10	600	0	0	0
Gifford Pinchot N.F.	0	8,960	880	0	0
Yakima I.R.	0	760	200	560	80
Olympic N.F.	0	680	0	80	0
Washington areas	3,050	17,620	8,770	1,970	80
Regional total	68,250	67,840	64,560	96,160	89,470

[1] N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 13.--Extent of mountain pine beetle infestations on lodgepole pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Deschutes N.F.	46	5,890	2,240	1,990	360	10,480
Fremont N.F.	118	25,220	7,390	3,590	2,180	38,380
Malheur N.F.	22	2,930	1,520	90	0	4,540
Rogue River N.F.	3	180	0	0	0	180
Siskiyou N.F.	1	30	0	0	0	30
Umatilla N.F.	6	670	0	0	0	670
Umpqua N.F.	2	200	0	0	0	200
Wallowa-Whitman N.F.	22	2,250	1,020	720	240	4,230
Winema N.F.	104	22,080	4,390	2,020	1,160	29,650
Crater Lake N.P.	15	880	150	0	0	1,030
Oregon areas	339	60,330	16,710	8,410	3,940	89,390
Washington:						
Yakima I.R.	1	80	0	0	0	80
Washington areas	1	80	0	0	0	80
Regional total	340	60,410	16,710	8,410	3,940	89,470

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 14.--Trend of mountain pine beetle infestations in sugar pine in Oregon, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Rogue River N.F.	160	0	490	130	1,200
Coos-Douglas Dist.	0	0	4,600	160	0
Siskiyou N.F.	0	0	1,030	4,110	300
Deschutes N.F.	0	0	40	50	440
Fremont N.F.	0	0	0	1,640	0
Winema N.F.	0	0	0	20	360
Umpqua N.F.	0	0	0	0	70
Oregon areas	160	0	6,160	6,110	2,370
Regional total	160	0	6,160	6,110	2,370

Table 15.--Extent of mountain pine beetle infestations on sugar pine in Oregon in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation				All intensities
		Light	Moderate	Heavy	Very heavy	
	Number	Acres				
Oregon:						
Deschutes N.F.	2	440	0	0	0	440
Rogue River N.F.	17	1,200	0	0	0	1,200
Siskiyou N.F.	8	300	0	0	0	300
Umpqua N.F.	1	70	0	0	0	70
Winema N.F.	2	360	0	0	0	360
Oregon areas	30	2,370	0	0	0	2,370
Regional total	30	2,370	0	0	0	2,370

1/ N.F., National Forest

DOUGLAS-FIR BEETLE
Dendroctonus pseudostugae Hopk.

Douglas-fir beetle damage was significantly lower in westside Douglas-fir stands in both States (Table 16). In Oregon, where the reduction from last year's serious damage was most evident, the majority of the damage was centered on Siuslaw and Willamette National Forests and on the Coos-Douglas District. Lesser damage occurred on the Umpqua, Siskiyou, Rogue River, and Mt. Hood National Forests. In Washington, all areas showed a downward or static trend in westside Douglas-fir. Tree killing occurred on the Gifford Pinchot, Snoqualmie, Mount Baker, and Olympic National Forests and on the Southwest Washington District (Table 17).

Damage to eastside Douglas-fir stands was also lower (Table 18). Substantial reduction occurred in eastern Oregon while losses in eastern Washington were only slightly downward. Most significant damage occurred on the Wallowa-Whitman and Malheur National Forests in Oregon and on the Colville and Okanogan National Forests, Colville Indian Reservation, and the Glenwood District in Washington (Table 19). Scattered tree killing was common over much of eastern Washington.

The downward trend is expected to continue in westside Douglas-fir stands. The trend of tree killing in eastside Douglas-fir stands is uncertain. No significant changes are expected within the next year. Infested trees are being salvaged wherever possible to reduce beetle populations and utilize the timber before it deteriorates. Salvaging of fire-killed trees is in progress to prevent development of serious bark beetle outbreaks within or adjacent to the large 1966 burns.

Table 16.--Trend of Douglas-fir beetle infestations in westside Douglas-fir in Oregon and Washington, 1962-66

(In acres)

Reporting area [1/]	Year				
	1962	1963	1964	1965	1966
Oregon:					
Coos-Douglas Dist.	0	0	19,630	69,720	19,310
Siuslaw N.F.	1,560	540	17,890	54,080	9,360
Umpqua N.F.	740	4,100	2,360	30,260	1,820
Willamette N.F.	0	410	720	17,850	9,310
Siskiyou N.F.	1,160	320	6,760	15,200	2,460
Rogue River N.F.	3,040	3,560	240	2,580	2,240
Northwest Oregon Dist.	0	0	0	1,400	20
Mt. Hood N.F.	600	0	450	400	760
Crater Lake N.P.	0	30	0	0	0
Oregon areas	7,100	8,960	48,050	191,490	45,280
Washington:					
Southwest Washington Dist.	320	0	0	3,680	1,280
Gifford Pinchot N.F.	2,550	1,880	460	2,930	2,980
Snoqualmie N.F.	1,800	850	230	2,260	680
Puget Sound Dist.	0	0	0	440	0
Olympic N.F.	0	120	0	440	80
Olympic N.P.	0	320	80	80	0
Northwest Washington Dist.	0	0	0	40	0
Mt. Baker N.F.	0	400	0	160	200
Washington areas	4,670	3,570	770	10,030	5,220
Regional total	11,770	12,530	48,820	201,520	50,500

[1/] N.F., National Forest; N.P., National Park

Table 17.--Extent of Douglas-fir beetle infestations on westside Douglas-fir in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of Infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number			Acres		
Oregon:						
Umpqua N.F.	41	1,520	300	0	0	1,820
Mt. Hood N.F.	16	760	0	0	0	760
Rogue River N.F.	41	2,120	0	120	0	2,240
Siskiyou N.F.	67	2,300	160	0	0	2,460
Siuslaw N.F.	188	7,380	1,980	0	0	9,360
Willamette N.F.	123	5,340	2,010	1,870	90	9,310
Northwest Oregon Dist.	1	20	0	0	0	20
Coos-Douglas Dist.	166	15,970	3,240	100	0	19,310
Oregon areas	643	35,410	7,690	2,090	90	45,280
Washington:						
Mt. Baker N.F.	2	200	0	0	0	200
Olympic N.F.	1	80	0	0	0	80
Snoqualmie N.F.	7	680	0	0	0	680
Southwest Wash. Dist.	11	1,280	0	0	0	1,280
Gifford Pinchot N.F.	28	1,720	880	380	0	2,980
Washington areas	49	3,960	880	380	0	5,220
Regional total	692	39,370	8,570	2,470	90	50,500

1/ N.F., National Forest

Table 18.--Trend of Douglas-fir beetle infestations in eastside Douglas-fir in Oregon and Washington, 1962-66

(In acres)

Reporting area [1/]	Year				
	1962	1963	1964	1965	1966
Oregon:					
Wallowa-Whitman N.F.	12,490	12,510	52,220	20,710	1,910
Umatilla N.F.	5,630	1,560	10,640	1,900	420
Malheur N.F.	520	240	810	6,160	1,250
Winema N.F.	0	210	0	0	0
Ochoco N.F.	650	860	470	550	110
Warm Springs I.R.	60	20	0	50	0
Umatilla I.R.	80	80	0	0	70
Central Oregon Dist.	0	110	0	0	210
Lookout Mt. Dist.	0	0	0	0	620
Oregon areas	19,430	15,590	64,140	29,370	4,590
Washington:					
Colville I.R.	7,650	11,460	2,050	2,300	4,440
Colville N.F.	14,900	8,240	4,630	8,780	4,860
Spokane I.R.	0	70	0	0	160
Yakima I.R.	0	320	0	0	0
Okanogan N.F.	24,060	31,950	6,830	12,160	10,400
Wenatchee N.F.	4,080	4,280	760	1,120	200
Glenwood Dist.	0	90	0	280	2,160
Kaniksu N.F.	220	160	360	180	80
Northeast Wash. Dist.	80	60	0	120	0
Umatilla N.F.	330	500	2,710	0	0
Washington areas	51,320	57,130	17,340	24,940	22,300
Regional total	70,750	72,720	81,480	54,310	26,890

[1/] N.F., National Forest; I.R., Indian Reservation

Table 19.--Extent of Douglas-fir beetle infestations on eastside Douglas-fir in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation				
		Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Malheur N.F.	17	1,030	220	0	0	1,250
Ochoco N.F.	3	110	0	0	0	110
Umatilla N.F.	13	350	0	70	0	420
Wallowa-Whitman N.F.	35	1,530	380	0	0	1,910
Umatilla I.R.	1	70	0	0	0	70
Central Oregon Dist.	1	30	180	0	0	210
Lookout Mt. Dist.	6	260	360	0	0	620
Oregon areas	76	3,380	1,140	70	0	4,590
Washington:						
Okanogan N.F.	57	5,800	3,440	1,160	0	10,400
Wenatchee N.F.	2	200	0	0	0	200
Colville N.F.	34	3,040	1,640	180	0	4,860
Colville I.R.	22	3,280	400	760	0	4,440
Spokane I.R.	1	160	0	0	0	160
Glenwood Dist.	2	2,160	0	0	0	2,160
Kaniksu N.F.	1	80	0	0	0	80
Washington areas	119	14,720	5,480	2,100	0	22,300
Regional total	195	18,100	6,620	2,170	0	26,890

1/ N.F., National Forest; I.R., Indian Reservation

WESTERN PINE BEETLE
Dendroctonus brevicomis Lec.

Infestations of the western pine beetle were sharply downward in both States (Table 20). The most serious outbreak areas in Oregon occurred on the Malheur, Fremont, Ochoco, and Deschutes National Forests. Losses in Washington were centered on the Wenatchee and Okanogan National Forests and the Colville and Yakima Indian Reservations (Table 21). Scattered tree killing occurred throughout most stands in eastern Washington and Oregon.

Table 20.--Trend of western pine beetle infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area[1/]	Year				
	1962	1963	1964	1965	1966
Oregon:					
Umatilla I.R.	0	50	0	0	0
Malheur N.F.	71,660	14,790	42,180	26,770	14,730
Fremont N.F.	99,010	43,900	15,990	30,760	6,650
Ochoco N.F.	119,010	5,040	16,870	14,760	6,070
Winema N.F.	14,360	13,160	9,960	11,710	2,260
Wallowa-Whitman N.F.	1,250	4,510	5,480	6,410	740
Umatilla N.F.	18,770	5,070	8,170	4,880	1,760
Deschutes N.F.	30,380	2,950	5,010	4,780	3,470
Warm Springs I.R.	19,240	480	440	1,480	880
Siskiyou N.F.	960	130	3,120	1,350	210
Rogue River N.F.	14,320	4,430	1,180	1,200	640
Central Oregon Dist.	0	730	0	440	150
Mt. Hood N.F.	2,640	1,530	0	60	260
Umpqua N.F.	160	1,260	740	0	0
Crater Lake N.P.	620	0	0	0	0
Willamette N.F.	0	360	0	0	0
Coos-Douglas Dist.	0	0	2,170	0	0
Oregon areas	392,380	98,390	111,310	104,600	37,820
Washington:					
Umatilla N.F.	110	80	510	0	110
Yakima I.R.	2,680	9,560	10,480	7,320	2,200
Wenatchee N.F.	0	6,890	1,740	5,160	4,160
Okanogan N.F.	340	7,500	3,810	3,640	1,380
Colville I.R.	940	320	2,120	3,360	1,120
Colville N.F.	0	2,160	920	1,760	0
Spokane I.R.	0	0	1,280	1,280	120
Snoqualmie N.F.	30	0	0	1,180	0
Glenwood Dist.	200	8,860	840	940	520
Northeast Washington Dist.	360	60	0	280	0
Gifford Pinchot N.F.	1,720	3,840	2,400	0	0
Washington areas	6,380	39,270	24,100	24,920	9,610
Regional total	398,760	137,660	135,410	129,520	47,430

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation.

Table 21.--Extent of western pine beetle infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Deschutes N.F.	15	3,110	360	0	0	3,470
Fremont N.F.	19	5,880	770	0	0	6,650
Malheur N.F.	76	13,610	1,120	0	0	14,730
Mt. Hood N.F.	3	260	0	0	0	260
Ochoco N.F.	39	6,070	0	0	0	6,070
Rogue River N.F.	13	520	120	0	0	640
Siskiyou N.F.	3	210	0	0	0	210
Umatilla N.F.	24	1,760	0	0	0	1,760
Wallowa-Whitman N.F.	15	740	0	0	0	740
Winema N.F.	17	2,260	0	0	0	2,260
Warm Springs I.R.	14	880	0	0	0	880
Central Oregon Dist.	1	150	0	0	0	150
Oregon areas	239	35,450	2,370	0	0	37,820
Washington:						
Okanogan N.F.	12	840	540	0	0	1,380
Umatilla N.F.	3	110	0	0	0	110
Wenatchee N.F.	21	3,640	520	0	0	4,160
Colville I.R.	9	680	440	0	0	1,120
Spokane I.R.	1	120	0	0	0	120
Yakima I.R.	6	1,880	320	0	0	2,200
Glenwood Dist.	1	0	520	0	0	520
Washington areas	53	7,270	2,340	0	0	9,610
Regional total	292	42,720	4,710	0	0	47,430

1/ N.F., National Forest; I.R., Indian Reservation

FIR ENGRAVER
Scolytus ventralis Lec.

Infestations of this bark beetle in true firs declined sharply in both Oregon and Washington (Table 22). Outbreaks of major importance occurred on the Umatilla and Wallowa-Whitman National Forests in Oregon and on the Wenatchee, Umatilla, and Okanogan National Forests in Washington (Table 23). Control efforts against the fir engraver have been limited to the salvage of the accessible, merchantable infested trees and those of declining thrift in the outbreak centers.

Table 22.--Trend of fir engraver infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Umatilla N.F.	41,770	8,660	24,040	22,200	4,100
Wallowa-Whitman N.F.	11,890	8,370	36,120	19,310	3,360
Ochoco N.F.	11,320	1,840	9,930	8,770	810
Malheur N.F.	3,200	1,810	5,090	5,400	450
Fremont N.F.	18,740	33,110	39,050	5,260	280
Umatilla I.R.	700	0	180	530	60
Winema N.F.	3,120	1,040	3,400	1,570	550
Mt. Hood N.F.	920	620	120	270	580
Rogue River N.F.	10,840	80	1,170	270	730
Central Oregon Dist.	0	1,580	710	150	270
Deschutes N.F.	950	430	290	60	0
Crater Lake N.P.	80	30	40	10	0
Umpqua N.F.	760	0	0	0	30
Willamette N.F.	1,000	660	0	0	260
Warm Springs I.R.	160	50	0	0	0
Lookout Mt. Dist.	0	0	480	0	0
Steens Mt. Dist.	0	0	200	0	0
Oregon areas	105,450	58,280	120,820	63,800	11,480
Washington:					
Umatilla N.F.	3,990	3,610	4,000	11,880	2,290
Wenatchee N.F.	680	5,040	2,860	3,340	1,120
Okanogan N.F.	1,180	4,190	3,510	3,200	1,880
Colville N.F.	2,950	880	490	2,580	180
Colville I.R.	0	0	80	490	80
Kaniksu N.F.	2,800	0	2,840	280	120
Gifford Pinchot N.F.	3,400	160	0	100	0
Northeast Washington District	280	0	0	0	0
Mt. Baker N.F.	1,540	940	280	0	160
Snoqualmie N.F.	5,480	880	840	0	40
Yakima I.R.	400	160	320	120	0
Glenwood Dist.	120	0	0	0	0
Washington areas	22,820	15,860	15,220	21,990	5,870
Regional total	128,270	74,140	136,040	85,790	17,350

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 23.--Extent of fir engraver infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number			Acres		
Oregon:						
Fremont N.F.	2	280	0	0	0	280
Malheur N.F.	8	330	120	0	0	450
Mt. Hood N.F.	8	380	0	0	200	580
Ochoco N.F.	11	580	60	170	0	810
Rogue River N.F.	8	730	0	0	0	730
Umatilla N.F.	53	3,310	790	0	0	4,100
Umpqua N.F.	1	30	0	0	0	30
Wallowa-Whitman N.F.	52	3,210	150	0	0	3,360
Willamette N.F.	2	260	0	0	0	260
Winema N.F.	10	390	160	0	0	550
Umatilla I.R.	1	60	0	0	0	60
Central Oregon Dist.	3	270	0	0	0	270
Oregon areas	159	9,830	1,280	170	200	11,480
Washington:						
Snoqualmie N.F.	1	40	0	0	0	40
Mt. Baker N.F.	1	160	0	0	0	160
Okanogan N.F.	10	560	1,200	120	0	1,880
Umatilla N.F.	27	2,290	0	0	0	2,290
Wenatchee N.F.	13	840	200	80	0	1,120
Colville N.F.	2	180	0	0	0	180
Colville I.R.	1	0	80	0	0	80
Kaniksu N.F.	1	120	0	0	0	120
Washington areas	56	4,190	1,480	200	0	5,870
Regional total	215	14,020	2,760	370	200	17,350

1/ N.F., National Forest; I.R., Indian Reservation

OREGON PINE IPS
Ips pini Say

Outbreaks of the Oregon pine ips were generally downward over the Region (Table 24). All areas in Washington showed a downward trend with only the Okanogan and Wenatchee National Forests and the Yakima Indian Reservation receiving significant tree killing. The downward trend in Oregon occurred in all but the Mt. Hood and Rogue River National Forests and the Central Oregon District (Table 25). Late fall observations revealed an Ips build-up on the Wallowa-Whitman National Forest where damage centers occurred in fringe-type stands.

Table 24.--Trend of Oregon pine ips infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Malheur N.F.	16,960	5,150	2,200	4,360	630
Wallowa-Whitman N.F.	13,580	3,410	40	3,820	0
Ochoco N.F.	3,090	220	740	3,730	860
Winema N.F.	360	1,790	1,820	1,780	0
Deschutes N.F.	0	330	150	950	20
Rogue River N.F.	2,240	250	880	420	1,140
Siskiyou N.F.	2,200	80	0	270	390
Fremont N.F.	1,740	1,890	540	170	70
Central Oregon Dist.	0	230	0	160	680
Warm Springs I.R.	0	190	0	130	0
Umatilla N.F.	3,130	1,470	0	30	0
Umatilla I.R.	110	0	0	110	0
Mt. Hood N.F.	200	570	1,000	70	80
Oregon areas	43,610	15,580	7,370	16,000	3,870
Washington:					
Okanogan N.F.	30	590	0	800	120
Wenatchee N.F.	0	0	160	740	240
Yakima I.R.	0	1,160	0	560	280
Colville I.R.	110	0	740	320	0
Spokane I.R.	10	0	200	320	0
Northeast Washington Dist.	400	0	0	160	0
Glenwood Dist.	20	130	520	60	0
Colville N.F.	100	200	330	140	0
Kaniksu N.F.	140	0	0	0	0
Umatilla N.F.	1,160	520	120	0	0
Snoqualmie N.F.	0	0	10	0	0
Washington areas	1,970	2,600	2,080	3,100	640
Regional total	45,580	18,180	9,450	19,100	4,510

1/ N.F., National Forest; I.R., Indian Reservation

Table 25.--Extent of Oregon pine ips infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon						
Deschutes N.F.	2	20	0	0	0	20
Fremont N.F.	2	70	0	0	0	70
Malheur N.F.	7	410	180	40	0	630
Mt. Hood N.F.	2	80	0	0	0	80
Ochoco N.F.	13	470	360	30	0	860
Rogue River N.F.	22	1,010	130	0	0	1,140
Siskiyou N.F.	11	390	0	0	0	390
Central Oregon Dist.	1	160	520	0	0	680
Oregon areas	60	2,610	1,190	70	0	3,870
Washington						
Okanogan N.F.	1	120	0	0	0	120
Wenatchee N.F.	3	80	160	0	0	240
Yakima I.R.	1	280	0	0	0	280
Washington areas	5	480	160	0	0	640
Regional total	65	3,090	1,350	70	0	4,510

1/ N.F., National Forest; I.R., Indian Reservation

SILVER FIR BEETLES
Pseudohylesinus spp.

Outbreaks of these beetles in Washington are continuing the upward trend of last year (Table 26). Serious tree killing in the overmature Pacific silver fir stands on the Mt. Baker and Snoqualmie National Forests and the Olympic National Park accounted for the upward trend. Less serious tree killing occurred on the Gifford Pinchot and Olympic National Forests and the Southwest Washington District (Table 27). The outlook for next year is for additional tree killing in the overmature stands. Timber harvesting in the outbreak and potential outbreak areas is the only control being applied in these highly susceptible overmature stands. No outbreaks of the silver fir beetles have been recorded in Oregon for the past four years.

Table 26.--Trend of silver fir beetles infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Siuslaw N.F.	480	0	0	0	0
Oregon areas	480	0	0	0	0
Washington:					
Southwest Wash. Dist.	0	0	0	0	120
Mt. Baker N.F.	0	51,120	520	5,660	9,740
Olympic N.F.	0	0	0	1,440	400
Olympic N.P.	0	0	150	920	1,120
Snoqualmie N.F.	0	3,360	560	1,260	1,000
Gifford Pinchot N.F.	0	200	0	0	120
Mt. Rainier N.P.	0	160	0	0	0
Washington areas	0	54,840	1,230	9,280	12,500
Regional total	480	54,840	1,230	9,280	12,500

1/ N.F., National Forest; N.P., National Park.

Table 27.--Extent of silver fir beetle infestations in Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Washington:						
Gifford Pinchot N.F.	3	120	0	0	0	120
Mt. Baker N.F.	35	5,020	4,600	120	0	9,740
Olympic N.F.	4	240	160	0	0	400
Snoqualmie N.F.	6	440	120	440	0	1,000
Southwest Washington District	1	120	0	0	0	120
Olympic N.P.	4	240	40	840	0	1,120
Washington areas	53	6,180	4,920	1,400	0	12,500
Regional total	53	6,180	4,920	1,400	0	12,500

1/ N.F., National Forest; N.P., National Park

ENGELMANN SPRUCE BEETLE
Dendroctonus obesus (Mann.)

Infestations of this beetle were slightly reduced in Oregon and slightly increased in Washington (Table 28). In Oregon, tree killing occurred on the Malheur, Wallowa-Whitman, and Umatilla National Forests. Tree killing continued at a reduced rate on the Wenatchee National Forest and increased substantially on the Okanogan National Forest in Washington. Elsewhere in Washington losses remained low (Table 29). Most of the infested acreage over the Region is in the high elevations and inaccessible areas, making beetle control by removal of infested trees impractical.

Table 28.--Trend of Engelmann spruce beetle infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area [1]	Year				
	1962	1963	1964	1965	1966
Oregon:					
Malheur N.F.	0	0	0	0	310
Wallowa-Whitman N.F.	130	2,690	2,760	7,220	5,340
Umatilla N.F.	860	1,420	840	190	520
Willamette N.F.	240	0	0	0	0
Oregon areas	1,230	4,110	3,600	7,410	6,170
Washington:					
Kaniksu N.F.	260	0	0	0	0
Wenatchee N.F.	120	600	0	3,080	1,840
Okanogan N.F.	480	4,890	280	380	2,000
Umatilla N.F.	4,180	4,040	320	310	30
Snoqualmie N.F.	400	1,480	0	0	0
Colville I.R.	80	0	0	0	160
Colville N.F.	80	0	0	0	160
Yakima I.R.	680	0	0	0	240
Washington areas	6,280	11,010	600	3,770	4,430
Regional total	7,510	15,120	4,200	11,180	10,600

[1] N.F., National Forest; I.R., Indian Reservation

Table 29.--Extent of Engelmann spruce beetle infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Malheur N.F.	4	150	160	0	0	310
Umatilla N.F.	11	520	0	0	0	520
Wallowa-Whitman N.F.	42	3,900	860	320	260	5,340
Oregon areas	57	4,570	1,020	320	260	6,170
Washington:						
Okanogan N.F.	11	840	320	840	0	2,000
Umatilla N.F.	1	30	0	0	0	30
Wenatchee N.F.	10	1,280	560	0	0	1,840
Colville N.F.	2	160	0	0	0	160
Colville I.R.	1	0	160	0	0	160
Yakima I.R.	2	240	0	0	0	240
Washington areas	27	2,550	1,040	840	0	4,430
Regional total	84	7,120	2,060	1,160	260	10,600

1/ N.F., National Forest; I.R., Indian Reservation

EUROPEAN PINE SHOOT MOTH
Rhyacionia bouliana (Schiff.)

Seventy-eight communities outside the Containment Zone were surveyed in Washington by the Washington State Department of Natural Resources. The shoot moth was found at Port Angeles, Longview, and Prosser. All of these are single residence finds with one to seven trees infested. In each case the infestation was traced to the movement of infested nursery stock.

In Oregon, 67 communities outside the Portland metropolitan area were surveyed with negative results by the Oregon State Board of Forestry. In the Portland metropolitan area, Oregon State Department of Agriculture surveyed all nurseries and the Oregon State Board of Forestry surveyed all other areas, including residences, etc. One nursery in northeast Portland was found infested with the moth. Case history is dim, but the infestation probably was introduced on infested nursery stock from the Seattle, Washington area in violation of quarantine regulations. All pines in the nursery were fumigated before moth flight and sprayed several times later in the season. In all probability there are no established shoot moth infestations in Oregon.

SPIDER MITE

Light defoliation of true firs and Douglas-fir occurred on 6,520 acres on the Malheur National Forest in areas where DDT was used to control the Douglas-fir tussock moth in 1965. These outbreaks usually develop during hot, dry summers following the use of DDT. This population of spider mites is expected to collapse before 1967 as the biological balance with natural predators reaches an equilibrium. Major tree damage is not expected.

PINE BUD MITE
Phytoptus pini Nal.

This eriophyid mite has been found infesting pine plantations on the Siskiyou, Umpqua, and Rogue River National Forests. Damage has been most severe on ponderosa pine, but Jeffrey, knobcone, and lodgepole pine have also received damage. In several plantations more than 50 percent of the trees had damage on several to many terminals; in others damage was light. In a few cases the suspected cause of death in some weaker trees has been this mite.

DOUGLAS-FIR TUSSOCK MOTH
Hemerocampa pseudotsugata McD.

Populations of the Douglas-fir tussock moth dropped to a very low level in both Oregon and Washington (Table 30). No new egg masses could be found with extensive ground surveys over wide areas of both States. This rapid and almost complete population collapse is due, in part, to the presence of a virus disease.

Table 30.--Trend of Douglas-fir tussock moth infestations in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Malheur N.F.	0	0	38,960	2,790	0
Ochoco N.F.	0	0	1,360	0	0
Fremont N.F.	0	0	0	2,120	0
Oregon areas	0	0	40,320	4,910	0
Washington:					
Northeast Washington District	100	1,170	14,260	2,580	0
Colville N.F.	0	280	3,440	0	0
Kaniksu N.F.	0	65	0	0	0
Washington areas	100	1,515	17,700	2,580	0
Regional total	100	1,515	58,020	7,490	0

1/ N.F., National Forest.

BLACK-HEADED BUDWORM
Acleres variana (Fern.)

The outbreaks recorded last year on the Malheur National Forest continued but at a much reduced rate. Light defoliation occurred on 100 acres in the Buck Cabin Creek drainage. Elsewhere in the Region subepidemic populations were found on the Kaniksu National Forest in Washington. No large scale outbreaks are expected next year.

WESTERN OAK LOOPER
Lambdina fiscellaria somniaria (Hulst.)

Outbreaks of this moth on Oregon white oak in the Willamette Valley of Oregon have declined for the third consecutive year. Defoliation was light, widely scattered, and limited to 340 acres. This downward trend is expected to continue.

CYPRESS TIP MOTH
Argyresthia sp.

Moderate defoliation of western redcedar occurred in the Ozette Lake area of the Olympic National Park in Washington. Parasitism by a hymenopterous parasite was high in the outbreak area. Populations are expected to be lower next year with little defoliation resulting.

HEMLOCK SAWFLY
Neodiprion tsugae Midd.

Light defoliation of western hemlock occurred in localized areas on the Mt. Hood National Forest in Oregon and around Spirit Lake on the Gifford Pinchot National Forest in Washington. The population is expected to decline due to a high rate of parasitism.

PANDORA MOTH
Coloradia pandora Blake

Regular flights of the moth occurred this year in the lodgepole pine stands on the Winema National Forest near Chemult, and in ponderosa pine stands near Sisters, Oregon. Defoliation next year is expected to be light.

SAWFLY ON WHITE FIR
Neodiprion sp.

Moderate defoliation occurred at a very limited distribution on the Winema National Forest in Oregon. No major defoliation is expected in 1967.

Table 31.--Extent of sawfly infestations on true firs in Oregon in 1966, by reporting area and intensity of infestation

Reporting area 1/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Winema N.F.	1	0	520	0	0	520
Oregon areas	1	0	520	0	0	520
Regional total	1	0	520	0	0	520

1/ N.F., National Forest

STRAWBERRY ROOT WEEVIL
Brachyrhinus ovatus (L.)

Adults of this soil inhabiting weevil caused severe damage to Douglas-fir seedlings in a new seed orchard on Siuslaw National Forest. This planting of Douglas-fir seedlings was in an old Oregon bent grass seed field where about 90 percent of the trees had been killed or severely injured at the time of control. The infestation was brought under control by tilling the soil and applying granular Aldrin.

DYING HEMLOCK

The problem of dying trees in the mature and overmature western hemlock stands of the Region was less extensive than last year (Table 32). In Oregon, one small center of the problem was noted on the Northwest Oregon District. Dying hemlock was common on the Mt. Baker, Olympic, and Snoqualmie National Forests and the Olympic National Park (Table 33).

The continuing program of accelerated harvesting of these overmature stands has accounted for much of the reduction in problem acreage.

Table 32.--Trend of dying hemlock in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Northwest Oregon Dist.	0	3,820	0	0	80
Siuslaw N.F.	1,280	0	0	0	0
Oregon areas	1,280	3,820	0	0	80
Washington:					
Mt. Baker N.F.	79,340	42,760	115,340	57,690	41,160
Olympic N.F.	60,800	80,720	60,830	16,040	6,680
Olympic N.P.	69,600	32,480	21,450	5,200	5,480
Snoqualmie N.F.	10,100	2,560	0	2,480	2,200
Southwest Washington District	3,840	0	0	2,080	240
Northwest Washington District	0	0	5,840	2,000	0
Quinault I.R.	0	1,800	0	0	0
Washington areas	223,680	160,320	203,460	85,490	55,840
Regional total	224,960	164,140	203,460	85,490	55,840

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 33.--Extent of dying hemlock in Oregon and Washington in 1966, by reporting area and intensity of damage

Reporting area 1/	Damage centers	Intensity of damage: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Northwest Oregon District	1	80	0	0	0	80
Oregon areas	1	80	0	0	0	80
Washington:						
Mt. Baker N.F.	56	25,160	10,120	4,320	1,560	41,160
Olympic N.F.	10	4,600	2,080	0	0	6,680
Snoqualmie N.F.	7	1,440	760	0	0	2,200
Southwest Washington District	4	0	0	160	80	240
Olympic N.P.	6	680	4,800	0	0	5,480
Washington areas	83	31,880	17,760	4,480	1,640	55,760
Regional total	84	31,960	17,760	4,480	1,640	55,840

1/ N.F., National Forest; N.P., National Park

TREE DAMAGE BY BEARS

Tree damage and killing by bears in young Douglas-fir and western hemlock stands increased in Oregon and decreased in Washington (Table 34). The seriousness of this problem is compounded by bears habitually working in areas already understocked. Serious damage occurred on the Siuslaw, Willamette, and Mt. Hood National Forests and on the Northwest Oregon District. In Washington the most seriously damaged areas were on the Gifford Pinchot, Olympic, and Snoqualmie National Forests and the Southwest Washington District (Table 35). The outlook for next year is for little overall change with local areas increasing or decreasing in damage received.

Table 34.--Trend of Tree damage by bears in Oregon and Washington, 1962-66

(In acres)

Reporting area 1/	Year				
	1962	1963	1964	1965	1966
Oregon:					
Northwest Oregon Dist.	42,920	32,610	37,770	10,330	20,560
Siuslaw N.F.	28,300	27,810	7,100	3,410	8,130
Willamette N.F.	26,200	2,250	7,200	2,100	5,270
Mt. Hood N.F.	12,280	2,720	960	1,510	2,000
Umpqua N.F.	0	150	180	0	0
Siskiyou N.F.	0	0	80	0	0
Oregon areas	109,700	65,540	53,290	17,350	35,960
Washington:					
Glenwood Dist.	0	0	0	0	760
Olympic N.F.	21,760	59,800	32,390	30,320	5,200
Gifford Pinchot N.F.	960	36,620	19,220	26,440	10,280
Southwest Washington Dist.	800	34,560	12,390	12,200	18,160
Snoqualmie N.F.	520	18,730	6,760	10,420	1,960
Quinault I.R.	3,360	360	2,280	560	160
Olympic N.P.	0	0	0	380	0
Puget Sound Dist.	0	0	0	260	0
Yakima I.R.	0	0	240	0	280
Washington areas	27,400	150,070	73,280	80,580	36,800
Regional total	137,100	215,610	126,570	97,930	72,760

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 35.--Extent of tree damage caused by bears in Oregon and Washington in 1966, by reporting area and intensity of damage

Reporting area [1]	Damage centers	Intensity of damage: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Oregon:						
Mt. Hood N.F.	18	2,000	0	0	0	2,000
Siuslaw N.F.	53	4,940	2,660	450	80	8,130
Willamette N.F.	44	4,250	1,020	0	0	5,270
Northwest Oregon District	40	17,960	2,200	400	0	20,560
Oregon areas	155	29,150	5,880	850	80	35,960
Washington:						
Gifford Pinchot N.F.	34	5,680	2,280	1,840	480	10,280
Olympic N.F.	21	2,280	2,560	360	0	5,200
Snoqualmie N.F.	12	1,720	0	120	120	1,960
Quinault I.R.	1	160	0	0	0	160
Yakima I.R.	1	280	0	0	0	280
Southwest Washington District	39	8,920	6,000	1,760	1,480	18,160
Glenwood Dist.	1	760	0	0	0	760
Washington areas	109	19,800	10,840	4,080	2,080	36,800
Regional total	264	48,950	16,720	4,930	2,160	72,760

[1] N.F., National Forest; I.R., Indian Reservation

APPENDIX

Aerial Surveys

The general aerial detection surveys were made in July and August with fixed-wing aircraft. The surveys were coordinated by the U.S. Forest Service in cooperation with the Oregon State Department of Forestry and the Washington State Department of Natural Resources. Larch casebearer surveys in northeastern Washington were made in early June also with a fixed-wing aircraft. Limited use was made of a helicopter to increase the accuracy of aerial mapping in preparation of logging plans to salvage mountain pine beetle mortality in lodgepole pine on the Fremont National Forest. Flying time for aerial surveys totaled 226.8 hours (Table 36).

Table 36.--Summary of cooperative aerial survey activities in 1966

Area covered	Timber area surveyed	Survey flight time		Total
		Mapping	Ferry	
	M acres	Hours		
Western Oregon	15,858	49.2	1.3	50.5
Eastern Oregon	14,881	56.5	2.6	59.1
All Oregon	30,739	105.7	3.9	109.6
Western Washington	13,061	46.9	8.2	55.1
Eastern Washington	9,989	49.7	12.4	62.1
All Washington	23,050	96.6	20.6	117.2
All Areas	53,789	202.3	24.5	226.8

Ground Surveys

Ground surveys included detection surveys for larch casebearer, Douglas-fir tussock moth, western hemlock looper, and European pine shoot moth, and biological evaluations of bark beetle outbreaks.

Ground surveys revealed small numbers of the green striped forest looper, Melanolophia imitata Wlk. in western Washington and larch looper, Semiothisa sexmacolata (Pack.) in northeast Washington. Only the larch looper has been recorded in outbreak conditions in Washington.

Table 37.--Extent of infestations in Oregon in 1966, by reporting area, insect species, and intensity of infestation

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Central Oregon District:						
Douglas-fir beetle	1	30	180	0	0	210
Fir engraver	3	270	0	0	0	270
Mountain pine beetle (P)	9	1,550	920	40	0	2,510
Oregon pine ips	1	160	520	0	0	680
Western pine beetle	1	150	0	0	0	150
All insects	15	2,160	1,620	40	0	3,820
Coos-Douglas District:						
Douglas-fir beetle	166	15,970	3,240	100	0	19,310
Mountain pine beetle (W)	1	80	0	0	0	80
Mountain pine beetle (P)	3	240	0	0	0	240
Balsam woolly aphid	28	3,700	660	700	0	5,060
All insects	198	19,990	3,900	800	0	24,690

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Crater Lake N.P.:						
Mountain pine beetle (L)	15	880	150	0	0	1,030
Mountain pine beetle (W)	13	540	390	420	240	1,590
Balsam woolly aphid	7	1,380	240	0	220	1,840
All insects	35	2,800	780	420	460	4,460
Deschutes N.F.:						
Mountain pine beetle (L)	46	5,890	2,240	1,990	360	10,480
Mountain pine beetle (S)	2	440	0	0	0	440
Mountain pine beetle (W)	1	30	0	0	0	30
Mountain pine beetle (P)	13	790	210	0	0	1,000
Oregon pine ips	2	20	0	0	0	20
Western pine beetle	15	3,110	360	0	0	3,470
Balsam woolly aphid	25	1,680	610	80	0	2,370
Needle miners (L)	33	67,940	4,760	1,840	0	74,540
All insects	137	79,900	8,180	3,910	360	92,350

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Fremont N.F.:						
Fir engraver	2	280	0	0	0	280
Mountain pine beetle (L)	118	25,220	7,390	3,590	2,180	38,380
Mountain pine beetle (W)	1	100	0	0	0	100
Mountain pine beetle (P)	59	3,650	3,690	390	420	8,150
Oregon pine ips	2	70	0	0	0	70
Western pine beetle	19	5,880	770	0	0	6,650
Needle miners (L)	1	240	0	0	0	240
All insects	202	35,440	11,850	3,980	2,600	53,870
Lookout Mt. District:						
Douglas-fir beetle	6	260	360	0	0	620
All insects	6	260	360	0	0	620

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Malheur N.F.:						
Douglas-fir beetle	17	1,030	220	0	0	1,250
Engelmann spruce beetle	4	150	160	0	0	310
Fir engraver	8	330	120	0	0	450
Mountain pine beetle (L)	22	2,930	1,520	90	0	4,540
Mountain pine beetle (P)	27	2,360	1,120	560	0	4,040
Oregon pine ips	7	410	180	40	0	630
Western pine beetle	76	13,610	1,120	0	0	14,730
Spider mite	7	6,520	0	0	0	6,520
Black-headed budworm	1	100	0	0	0	100
All insects	169	27,440	4,440	690	0	32,570
Mt. Hood N.F.:						
Douglas-fir beetle	16	760	0	0	0	760
Fir engraver	8	380	0	0	200	580
Mountain pine beetle (W)	56	5,080	1,660	980	0	7,720
Mountain pine beetle (P)	13	550	270	80	0	900
Oregon pine ips	2	80	0	0	0	80
Western pine beetle	3	260	0	0	0	260
Balsam woolly aphid	48	5,870	490	100	0	6,460
All insects	146	12,980	2,420	1,160	200	16,760
Bear damage	18	2,000	0	0	0	2,000
All damage	164	14,980	2,420	1,160	200	18,760

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Northwest Oregon District:						
Douglas-fir beetle	1	20	0	0	0	20
All insects	1	20	0	0	0	20
Bear damage	40	17,960	2,200	400	0	20,560
Dying hemlock	1	80	0	0	0	80
All damage	42	18,060	2,200	400	0	20,660
Ochoco N.F.:						
Douglas-fir beetle	3	110	0	0	0	110
Fir engraver	11	580	60	170	0	810
Mountain pine beetle (P)	6	630	0	0	0	630
Oregon pine ips	13	470	360	30	0	860
Western pine beetle	39	6,070	0	0	0	6,070
All insects	72	7,860	420	200	0	8,480

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Rogue River N.F.:						
Douglas-fir beetle	41	2,120	0	120	0	2,240
Fir engraver	8	730	0	0	0	730
Mountain pine beetle (L)	3	180	0	0	0	180
Mountain pine beetle (S)	17	1,200	0	0	0	1,200
Mountain pine beetle (W)	7	480	0	0	0	480
Mountain pine beetle (P)	5	370	0	0	0	370
Oregon pine ips	22	1,010	130	0	0	1,140
Western pine beetle	13	520	120	0	0	640
Balsam woolly aphid	26	1,850	740	1,320	940	4,850
All insects	142	8,460	990	1,440	940	11,830
Siskiyou N.F.:						
Douglas-fir beetle	67	2,300	160	0	0	2,460
Mountain pine beetle (L)	1	30	0	0	0	30
Mountain pine beetle (W)	80	4,870	790	0	0	5,660
Mountain pine beetle (P)	6	260	0	0	0	260
Mountain pine beetle (S)	8	300	0	0	0	300
Oregon pine ips	11	390	0	0	0	390
Western pine beetle	3	210	0	0	0	210
Balsam woolly aphid	1	840	0	0	0	840
All insects	177	9,200	950	0	0	10,150

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Siuslaw N.F.:						
Douglas-fir beetle	188	7,380	1,980	0	0	9,360
Balsam woolly aphid	2	120	0	0	0	120
Western oak looper	2	340	0	0	0	340
All insects	192	7,840	1,980	0	0	9,820
Bear damage	53	4,940	2,660	450	80	8,130
All damage	245	12,780	4,640	450	80	17,950
Umatilla I.R.:						
Douglas-fir beetle	1	70	0	0	0	70
Fir engraver	1	60	0	0	0	60
Mountain pine beetle (P)	2	80	0	0	0	80
All insects	4	210	0	0	0	210

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Umatilla N.F.:						
Douglas-fir beetle	13	350	0	70	0	420
Engelmann spruce beetle	11	520	0	0	0	520
Fir engraver	53	3,310	790	0	0	4,100
Mountain pine beetle (L)	6	670	0	0	0	670
Mountain pine beetle (P)	22	1,430	30	0	0	1,460
Western pine beetle	24	1,760	0	0	0	1,760
All insects	129	8,040	820	70	0	8,930
Umpqua N.F.:						
Douglas-fir beetle	41	1,520	300	0	0	1,820
Fir engraver	1	30	0	0	0	30
Mountain pine beetle (L)	2	200	0	0	0	200
Mountain pine beetle (W)	254	14,260	5,860	840	170	21,130
Mountain pine beetle (P)	3	200	0	0	0	200
Mountain pine beetle (S)	1	70	0	0	0	70
Balsam woolly aphid	21	2,790	790	0	0	3,580
All insects	323	19,070	6,950	840	170	27,030

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Wallowa-Whitman N.F.:						
Douglas-fir beetle	35	1,530	380	0	0	1,910
Engelmann spruce beetle	42	3,900	860	320	260	5,340
Fir engraver	52	3,210	150	0	0	3,360
Mountain pine beetle (L)	22	2,250	1,020	720	240	4,230
Mountain pine beetle (P)	141	12,280	7,710	4,020	4,470	28,480
Western pine beetle	15	740	0	0	0	740
All insects	307	23,910	10,120	5,060	4,970	44,060
Warm Springs I.R.:						
Mountain pine beetle (P)	4	320	0	0	0	320
Western pine beetle	14	880	0	0	0	880
Balsam woolly aphid	5	420	0	0	0	420
Larch sawfly	1	5,600	0	0	0	5,600
All insects	24	7,220	0	0	0	7,220

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Willamette N.F. :						
Douglas-fir beetle	123	5,340	2,010	1,870	90	9,310
Fir engraver	2	260	0	0	0	260
Mountain pine beetle (W)	244	19,380	8,540	4,630	2,200	34,750
Balsam woolly aphid	128	13,050	3,700	30	0	16,780
All insects	497	38,030	14,250	6,530	2,290	61,100
Bear damage	44	4,250	1,020	0	0	5,270
All damage	541	42,280	15,270	6,530	2,290	66,370

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation: centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Winema N.F.:						
Fir engraver	10	390	160	0	0	550
Mountain pine beetle (L)	104	22,080	4,390	2,020	1,160	29,650
Mountain pine beetle (S)	2	360	0	0	0	360
Mountain pine beetle (P)	39	3,190	1,560	600	240	5,590
Western pine beetle	17	2,260	0	0	0	2,260
Sawfly (true fir)	1	0	520	0	0	520
Needle miner (L)	46	41,260	19,270	6,360	6,790	73,680
Needle miner (P)	9	46,640	0	0	0	46,640
All insects	228	116,180	25,900	8,980	8,190	159,250

1/ Mountain pine beetle and needle miner damage has been separated by tree species attacked: L, lodgepole pine; P, ponderosa pine; W, western white pine: K, knobcone pine; S, sugar pine.

2/ Reporting areas are abbreviated as follows: N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

Table 38.--Extent of infestations in Washington in 1966, by reporting area, insect species, and intensity of infestation

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Colville N.F.:						
Douglas-fir beetle	34	3,040	1,640	180	0	4,860
Engelmann spruce beetle	2	160	0	0	0	160
Fir engraver	2	180	0	0	0	180
Mountain pine beetle (W)	14	1,500	1,600	680	1,040	4,820
Mountain pine beetle (P)	11	1,120	200	0	760	2,080
Larch casebearer	25	43,400	13,880	3,880	2,680	63,840
Larch sawfly	10	1,800	3,760	900	240	6,700
All insects	98	51,200	21,080	5,640	4,720	82,640
Colville I.R.:						
Douglas-fir beetle	22	3,280	400	760	0	4,440
Engelmann spruce beetle	1	0	160	0	0	160
Fir engraver	1	0	80	0	0	80
Mountain pine beetle (P)	20	1,280	2,280	200	240	4,000
Western pine beetle	9	680	440	0	0	1,120
Larch casebearer	4	400	0	0	2,200	2,600
All insects	57	5,640	3,360	960	2,440	12,400

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Gifford Pinchot N.F.:						
Douglas-fir beetle	28	1,720	880	380	0	2,980
Mountain pine beetle (W)	16	2,680	520	400	120	3,720
Silver fir beetles	3	120	0	0	0	120
Balsam wooly aphid	29	3,960	1,360	2,640	400	8,360
All insects	76	8,480	2,760	3,420	520	15,180
Bear damage	34	5,680	2,280	1,840	480	10,280
All damage	110	14,160	5,040	5,260	1,000	25,460
Glenwood District:						
Douglas-fir beetle	2	2,160	0	0	0	2,160
Mountain pine beetle (P)	3	560	0	0	0	560
Western pine beetle	1	0	520	0	0	520
All insects	6	2,720	520	0	0	3,240
Bear damage	1	760	0	0	0	760
All damage	7	3,480	520	0	0	4,000

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Kaniksu N.F.:						
Douglas-fir beetle	1	80	0	0	0	80
Fir engraver	1	120	0	0	0	120
Mountain pine beetle (W)	9	2,120	0	0	0	2,120
Larch sawfly	2	0	480	840	0	1,320
Larch casebearer	21	144,180	21,720	35,200	43,040	244,140
All insects	34	146,500	22,200	36,040	43,040	247,780
Mt. Baker N.F.:						
Douglas-fir beetle	2	200	0	0	0	200
Fir engraver	1	160	0	0	0	160
Mountain pine beetle (W)	42	6,640	1,640	40	0	8,320
Silver fir beetles	35	5,020	4,600	120	0	9,740
All insects	80	12,020	6,240	160	0	18,420
Dying hemlock	56	25,160	10,120	4,320	1,560	41,160
All damage	136	37,180	16,360	4,480	1,560	59,580

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Mt. Rainier N.P.:						
Mountain pine beetle (W)	3	840	0	0	40	880
Balsam woolly aphid	2	360	0	0	440	800
All insects	5	1,200	0	0	480	1,680
Northeast Washington District:						
Mountain pine beetle (W)	1	40	0	0	0	40
Mountain pine beetle (P)	1	0	240	0	0	240
Larch casebearer	49	59,720	42,500	27,320	7,960	137,500
All insects	51	59,760	42,740	27,320	7,960	137,780

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Okanogan N.F.:						
Douglas-fir beetle	57	5,800	3,440	1,160	0	10,400
Engelmann spruce beetle	11	840	320	840	0	2,000
Fir engraver	10	560	1,200	120	0	1,880
Mountain pine beetle (W)	7	1,320	240	0	0	1,560
Mountain pine beetle (P)	41	4,480	5,680	1,120	760	12,040
Oregon pine ips	1	120	0	0	0	120
Western pine beetle	12	840	540	0	0	1,380
Larch sawfly	2	0	280	0	0	280
All insects	141	13,960	11,700	3,240	760	29,660
Olympic N.F.:						
Douglas-fir beetle	1	80	0	0	0	80
Mountain pine beetle (W)	6	1,320	560	440	0	2,320
Silver fir beetles	4	240	160	0	0	400
All insects	11	1,640	720	440	0	2,800
Bear damage	21	2,280	2,560	360	0	5,200
Dying hemlock	10	4,600	2,080	0	0	6,680
All damage	42	8,520	5,360	800	0	14,680

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Olympic N.P.:						
Mountain pine beetle	64	6,720	3,340	2,040	880	12,980
Silver fir beetles	4	240	40	840	0	1,120
All insects	68	6,960	3,380	2,880	880	14,100
Dying hemlock	6	680	4,800	0	0	5,480
All damage	74	7,640	8,180	2,880	880	19,580
Quinault I.R.:						
Mountain pine beetle (W)	11	3,750	0	400	600	4,750
All insects	11	3,750	0	400	600	4,750
Bear damage	1	160	0	0	0	160
All damage	12	3,910	0	400	600	4,910

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Snoqualmie N.F.:						
Douglas-fir beetle	7	680	0	0	0	680
Mountain pine beetle (W)	38	3,720	4,340	800	240	9,100
Silver fir beetles	6	440	120	440	0	1,000
Balsam woolly aphid	11	1,040	400	40	200	1,680
Fir engraver	1	40	0	0	0	40
All insects	63	5,920	4,860	1,280	440	12,500
Bear damage	12	1,720	0	120	120	1,960
Dying hemlock	7	1,440	760	0	0	2,200
All damage	82	9,080	5,620	1,400	560	16,660

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Southwest Washington District:						
Douglas-fir beetle	11	1,280	0	0	0	1,280
Silver fir beetles	1	120	0	0	0	120
All insects	12	1,400	0	0	0	1,400
Bear damage	39	8,920	6,000	1,760	1,480	18,160
Dying hemlock	4	0	0	160	80	240
All damage	55	10,320	6,000	1,920	1,560	19,800
Spokane I.R.:						
Douglas-fir beetle	1	160	0	0	0	160
Mountain pine beetle (W)	1	240	0	0	0	240
Mountain pine beetle (P)	2	200	0	0	0	200
Western pine beetle	1	120	0	0	0	120
Larch casebearer	8	17,180	3,840	1,580	0	22,600
All insects	13	17,900	3,840	1,580	0	23,320

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Umatilla N.F.:						
Engelmann spruce beetle	1	30	0	0	0	30
Fir engraver	27	2,290	0	0	0	2,290
Mountain pine beetle (P)	7	1,030	0	0	0	1,030
Western pine beetle	3	110	0	0	0	110
All insects	38	3,460	0	0	0	3,460
Wenatchee N.F.:						
Douglas-fir beetle	2	200	0	0	0	200
Engelmann spruce beetle	10	1,280	560	0	0	1,840
Fir engraver	13	840	200	80	0	1,120
Mountain pine beetle (W)	74	8,160	5,960	4,680	2,840	21,640
Mountain pine beetle (P)	5	440	100	80	240	860
Oregon pine ips	3	80	160	0	0	240
Western pine beetle	21	3,640	520	0	0	4,160
All insects	128	14,640	7,500	4,840	3,080	30,060

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

Reporting area and insects involved 1/ 2/	Infestation centers	Intensity of infestation: Light	Moderate	Heavy	Very heavy	All intensities
	Number	Acres				
Yakima I.R.:						
Engelmann spruce beetle	2	240	0	0	0	240
Mountain pine beetle (L)	1	80	0	0	0	80
Mountain pine beetle (W)	6	520	1,040	360	0	1,920
Mountain pine beetle (P)	3	600	120	0	0	720
Western pine beetle	6	1,880	320	0	0	2,200
Balsam woolly aphid	2	80	0	240	0	320
Oregon pine ips	1	280	0	0	0	280
All insects	21	3,680	1,480	600	0	5,760
Bear damage	1	280	0	0	0	280
All damage	22	3,960	1,480	600	0	6,040

1/ Mountain pine beetle damage has been separated by tree species attacked: L, lodgepole pine; P, ponderosa pine; W, western white pine.

2/ Reporting areas are abbreviated as follows: N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

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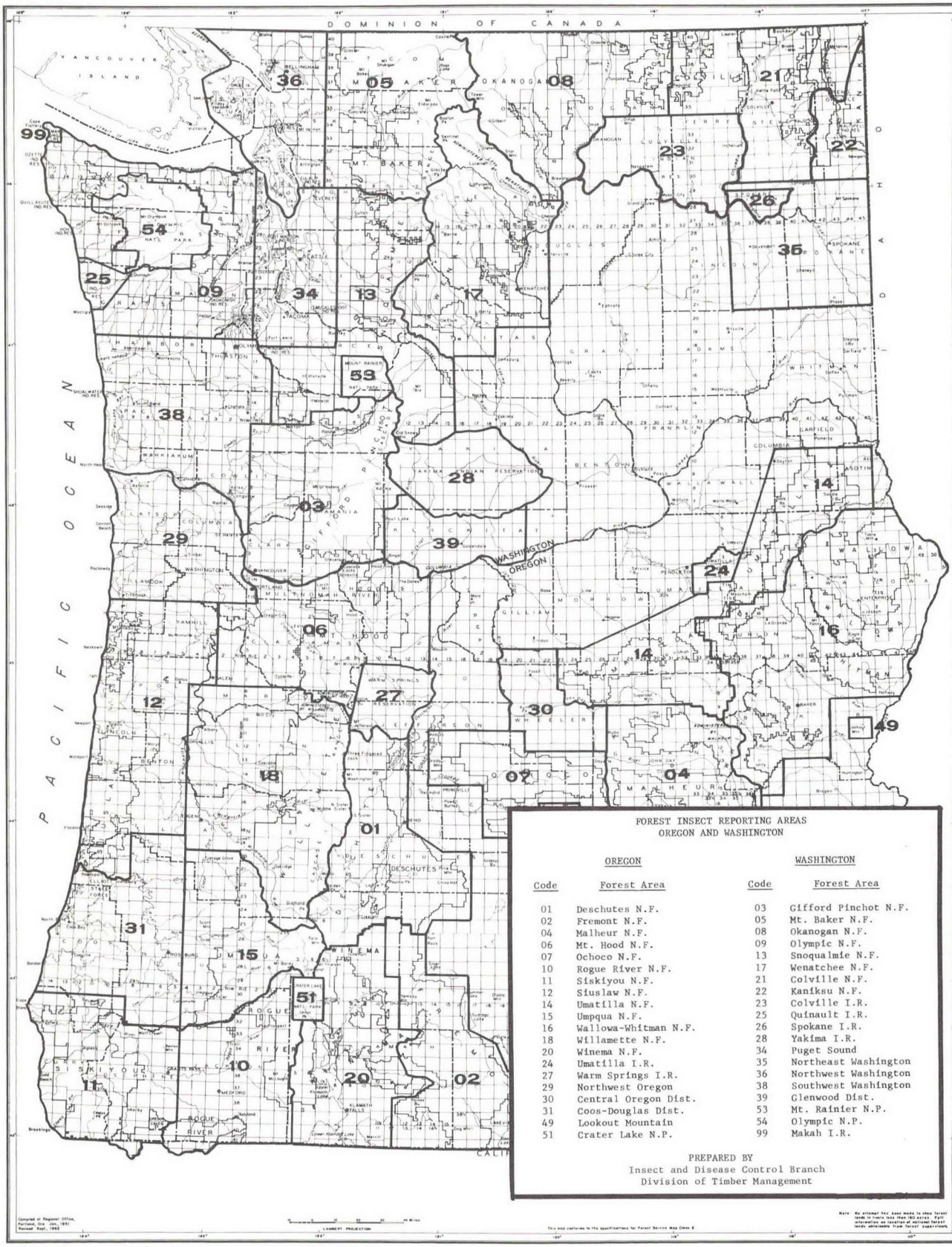

FOREST INSECT REPORTING AREAS
OREGON AND WASHINGTON

OREGON		WASHINGTON	
Code	Forest Area	Code	Forest Area
01	Deschutes N.F.	03	Gifford Pinchot N.F.
02	Fremont N.F.	05	Mt. Baker N.F.
04	Malheur N.F.	08	Okanogan N.F.
06	Mt. Hood N.F.	09	Olympic N.F.
07	Ochoco N.F.	13	Snoqualmie N.F.
10	Rogue River N.F.	17	Wenatchee N.F.
11	Siskiyou N.F.	21	Colville N.F.
12	Siuslaw N.F.	22	Kaniksu N.F.
14	Umatilla N.F.	23	Colville I.R.
15	Umpqua N.F.	25	Quinault I.R.
16	Wallowa-Whitman N.F.	26	Spokane I.R.
18	Willamette N.F.	28	Yakima I.R.
20	Winema N.F.	34	Puget Sound
24	Umatilla I.R.	35	Northeast Washington
27	Warm Springs I.R.	36	Northwest Washington
29	Northwest Oregon	38	Southwest Washington
30	Central Oregon Dist.	39	Glenwood Dist.
31	Coos-Douglas Dist.	53	Mt. Rainier N.P.
49	Lookout Mountain	54	Olympic N.P.
51	Crater Lake N.P.	99	Makah I.R.

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Division of Timber Management

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LAMBERT PROJECTION

This map conforms to the specifications for Forest Service Map Class 6

Note: No attempt has been made to show forest lands in tracts less than 160 acres. For information on location of national forest lands addressable from forest supervisors.